LH1020
LH1025

AC Clamp On Multimeters
Pinces Multimétriques AC
AC Zangen Multimeter
Multimetri tenaglia c.a.
Multímetros de incerción de C.A.

Operating Instructions
Mode d'emploi
Bedienungsanleitung
Istruzioni per il funzionamento
Instrucciones de Funcionamiento

LEM

International Electrical Symbols	
⚠	Caution! Refer to this manual before using the meter
⧈	Meter is protected by Reinforced or Double Insulation

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1. INTRODUCTION

The advanced design of the LH1020 and LH1025 AC Clamp On Multimeters ensure reliable and accurate measurements under a wide range of operating conditions. Measurement features include:

- Non-intrusive AC current
- LH1025. True RMS for complex and distorted currents
- LH1020. Average responding, RMS calibrated
- Autoranging and Autozeroing
- AC/DC Volts
- Ohms, Continuity and Diode Test
- Max RMS (surge) Current and Voltage (LH1025 only)
- Data Hold

The LH series of instruments conform to the latest international directives and standards concerning safety and electromagnetic compatibility.

- European Low Voltage Directives 73/23/EEC and 93/68/EEC
- European EMC Directives 89/336/EEC and 93/68/EEC
- Submitted for approval to UL 3111-1

Safety Standards

IEC 1010-1 : 1992-09 Safety requirements for electrical equipment for measurement, control and laboratory use.

Part 2-032 : 1994-12 Particular requirements for hand held current clamps for electrical measurement and test.

Part 2-031 : 1993-02 Particular requirements for hand held probe assemblies for electrical measurement and test.

600V Cat III Pollution degree 2

EMC Standards

RF Susceptibility

EN 50082-1 : 1992 3V/m Residential, Commercial and Light Industry

RF Emissions

EN 50081-1 : 1992 Residential, Commercial and Light Industry

FCC Part 15 Class B

1.1 Instrument Features

The main operating features of the instrument are as follows. See Fig. 1.

(1) Clamp-on jaws for current measurement

(2) Jaw opening lever

(3) Rotary switch for function selection

(4) Push button switch for MAX /))) selection.

(MAX: LH1025 only)

MAX holds the maximum RMS value when in the current or volts mode.

))) selects continuity buzzer when in Ohms mode

(5) Push button switch for display HOLD

(6) and (7) - Test lead input terminals

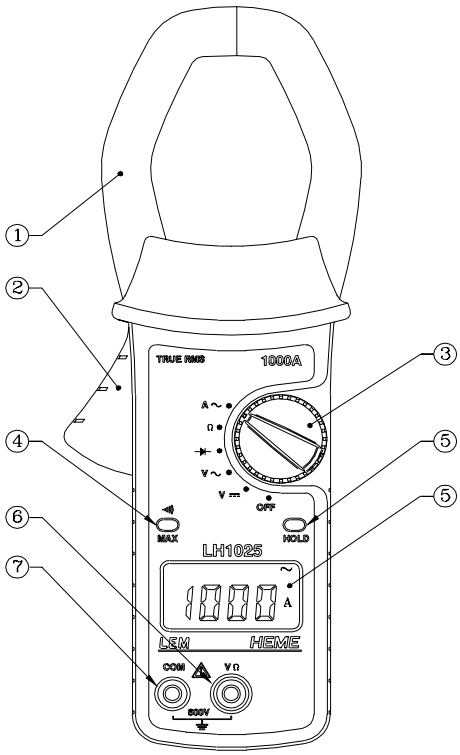


Fig. 1
Instrument Features

2. SPECIFICATION

2.1 Electrical data

(All accuracies stated at 23°C ± 1°C)

2.1.1 Current measurement

LH1020
(AC)

Measuring range ..... 0 - 1000A AC

Autorange facility ..... 400A / 1000A

Resolution..... 100mA in 400A range
1A in 1000A range

Accuracy

	10 - 700A	700 - 1000A
50 - 60Hz	± 1.5% rdg ± 5 dgts	± 3% rdg ± 5 dgts
60 - 400 Hz	± 2% rdg ± 5 dgts	

Maximum overload..... 1200A RMS

Amps AC is average responding, sinewave calibrated.

LH1025
(ACRMS)

Measuring range ..... 0 - 1000A AC

Autorange facility ..... 400A / 1000A

Resolution..... 100mA in 400A range
1A in 1000A range

Accuracy

	10 - 700A	700 - 1000A
50 - 60Hz	1.5% rdg ± 5 dgts	3% rdg ± 5 dgts
60 - 400Hz	2% rdg ± 5 dgts	
400 - 1000Hz	4% rdg ± 5 dgts	

Maximum overload..... 1200A RMS

Crest factor ..... 4 maximum

Amps AC is a true RMS measurement.

WARNING **The measuring duty cycle should not exceed the following limits**	
0 - 600A RMS	**Continuous**
600 - 700A RMS	**10 min on 10 min off**
700 - 1000A RMS	**5 min on 20 min off**

2.1.2 Max RMS Current (LH1025 only)

This function is actuated by pressing MAX/))) when in ACRMS. Typical acquisition time is 100ms

Accuracy

	10 - 400A	400 - 700A	700 - 1000A
50 - 60 Hz	± 2% rdg ± 7 dgts	± 2% rdg ± 5 dgts	± 4% rdg ± 5 dgts
60 - 400 Hz	± 3% rdg ± 5 dgts	± 3% rdg ± 5 dgts	
400 - 1000 Hz	± 5% rdg ± 5 dgts	± 6% rdg ± 5 dgts	

Crest Factor ..... 4 maximum

2.1.3 Voltage measurement

DC, AC (RMS on LH1025)

Measuring range 0-600V

Autorange Facility ..... 400V / 600V

Resolution ..... 100mV in 400V range
1V in 600V range

Accuracy AC/DC ..... ± 1% rdg ± 3 digits

AC ≤ 10V ..... ± 1% rdg ± 5 digits

Frequency Range ..... DC in DC

AC: LH1020 AC 50Hz to 400Hz

LH1025 ACRMS 15Hz to 1kHz

Maximum Overload 1000V

Crest Factor ..... 4 maximum

2.1.4 Max RMS Voltage (LH1025 only)

This function is activated by pressing MAX/))) when in ACRMS. No polarity indication is given in DC. Typical acquisition time is 100mS

Accuracy	V > 10V	± 2% rdg ± 4 dgts
	V ≤ 10V	± 0.5V
Frequency Range.		DC and 15 Hz to 1kHz in ACRMS
Crest Factor		4 maximum

2.1.5 Diode Test

Measurement of the voltage drop across a forward biased diode.

Measuring range	0 - 2V
Resolution	1mV
Accuracy	± 1% rdg ± 2 digits
Input protection	600V (DC or sinewave RMS)

2.1.6 Resistance Measurement

Measuring range	0 - 4 kΩ
Autorange Facility	400Ω / 4kΩ
Resolution	100mΩ in 400Ω range 1Ω in 4kΩ range
Accuracy	± 1% rdg ± 3 digits
Input protection	600V (DC or sinewave RMS)

2.1.7 Continuity

This function is actuated by pressing the MAX /))) button when in Ω measurement. The buzzer will sound for values of resistance below approximately 50Ω.

2.2 General Data

2.2.1 Display

Display 4000 count 12mm high characters.

	Low battery indicator
Pk	Max RMS Amps or Volts (LH1025 only)
~	AC
⎓	DC
	Diode
kΩ	Ohms
)))	Continuity
H	Hold

2.2.2 Power Supply

Battery Type 9V Alkaline PP3, NEDA1604 or IEC 6LR61

Battery life typically 60 hours continuous operation.

2.2.3 Environmental

FOR INDOOR USE ONLY

Reference conditions. All accuracies stated at 23°C ± 1°C

Operating Temperature 0°C to 50°C (32°F to 122°F)

Maximum Relative Humidity 80% for temperatures up to 31°C (87°F) decreasing linearly to 50% Relative Humidity at 40°C (104°F)

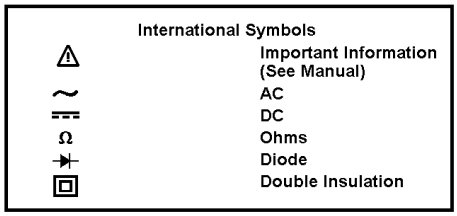
Storage Temperature -20°C to +60°C (-4°F to 140°F)

Maximum operating altitude 2000m.

2.2.4 Mechanical

Dimensions.....	Length ....260mm / 10.25”
	Width.....98mm / 3.86”
	Depth.....52mm / 2.05”
Weight	520g / 1.14 lbs.
Case Material.....	Bayblend T85MN
Jaw Opening.....	52mm / 2.05”
Accessories	Voltage probes
	Carrying case
	Operators manual
Cleaning	The unit can be cleaned with an isopropanol impregnated cloth. Do not use abrasives or other solvents.

3. OPERATING INSTRUCTIONS



The instrument function is selected by a rotary switch with the following positions :-

OFF	Instrument off
V ⎓	Volts DC
V~	Volts AC (LH1025 - true RMS)
⏩	Diode measurement
Ω	Ohms measurement
A~	Amps AC (LH1025 - true RMS)

3.1 Measurement of AC current

- **Remove any Voltage test leads from the instrument.**
- Move the rotary switch to Amps AC
- Press the trigger to open the jaws and clamp them around the current carrying conductor as shown in Fig. 2
- Read the display
- Use the HOLD button to freeze the display.
- Use the))) / MAX button to measure the max RMS current (LH1025 only)

3.2 Resistance Measurement

- Insert the test leads into the sockets on the front of the instrument, the red lead to the VΩ terminal and the black lead to the COM terminal.
- Move the rotary switch to the Ω position.
- Apply the test leads across the component whose resistance is to be measured. Read the displayed value.
- Use the HOLD button to freeze the display. Use the))) / MAX button to select the continuity facility. The buzzer will sound for resistance measurements below approximately 50Ω.

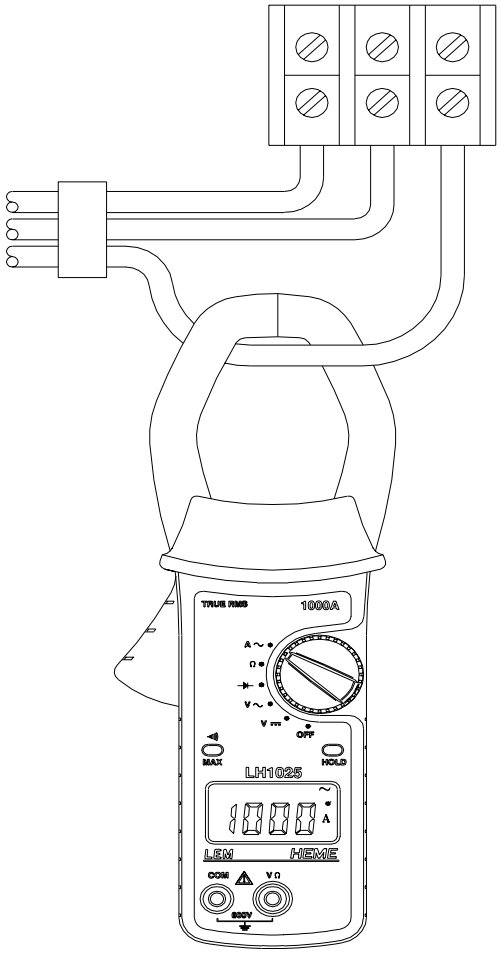


Fig. 2
Current Measurement

3.3 Measurement of AC or DC Voltage

SAFETY WARNING
To avoid possible electric shock and damage to the instrument, do not attempt to measure any voltage that might exceed the maximum range of the instrument - 600Vrms and 1kHz.

- Move the rotary switch to the VDC or VAC position
- Insert the test leads into the sockets on the front of the instrument. Connect the RED lead to the VΩ terminal and the black lead to the COM terminal.
- Apply the test leads to the circuit under test and read the displayed voltage. See Fig. 3
- Use the HOLD button to freeze the display.
- Use the))) / MAX button to measure the max RMS voltage (LH1025 only)

3.4 DiodeTest

- Insert the test leads into the sockets on the front of the instrument, the red lead to the VΩ terminal and the black lead to the COM terminal.
- Move the rotary switch to the position.
- Apply the test leads across the diode to be tested. Read the displayed value.
- Use the HOLD button to freeze the display.

4. SAFETY

The instrument has been designed to comply with IEC1010-2-032 Installation Category (Overvoltage Category) III 600V Pollution degree 2 and UL 3111-1. The product range conforms with the EEC Low Voltage Directive 73/23/EEC and 93/68/EEC. IEC 1010 is a safety standard which has the following features:

- Installation categories I to IV relate the maximum working voltage to overvoltage transients that can be expected in the measuring environment. For the LH range of instruments, 600V CATIII, the maximum expected transients must not exceed 6kV peak.
- In a pollution degree 2 environment the internal design of the instrument can cope with transient conductivities due to condensation.

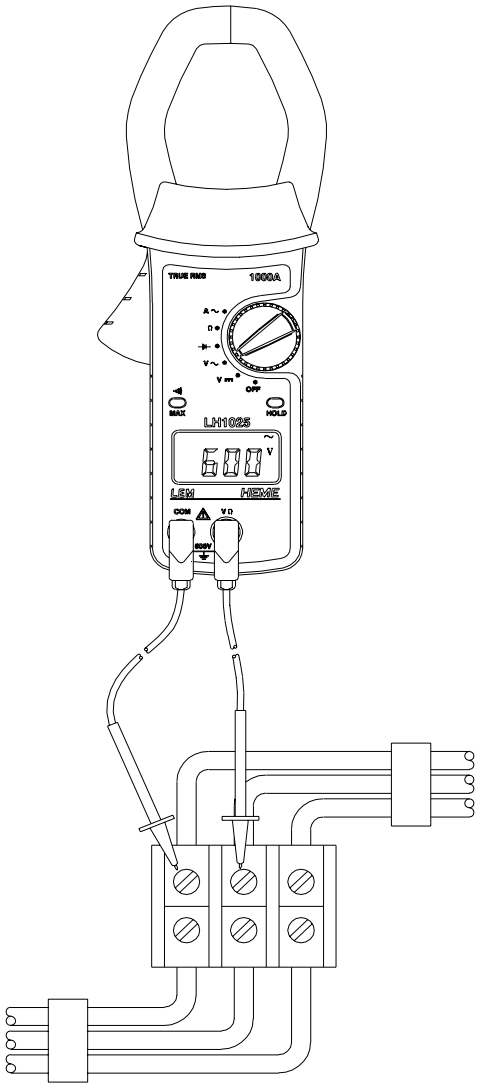


Fig. 3
Voltage Measurement

Safe operation of the instrument is the responsibility of the operator who must be suitably qualified and/or authorised.

Maximum Safe Voltage
Current :- 600V MAXIMUM AC RMS or DC between uninsulated conductor and ground and maximum frequency of 1kHz. This limitation applies to bare conductors only.
Voltage:- 600V MAXIMUM AC RMS or DC between live conductor and ground. 600V MAXIMUM AC RMS or DC between VΩ and COM terminals and a maximum frequency of 1kHz.

Important Information

- The instrument is intended for indoor use only.
- Do not attempt to take any measurement of current or voltage higher than the maximum range of the instrument.
- The unit is not hermetically sealed and should NOT be brought into contact with surface water.
- Frequently inspect the test leads and the instrument for damage. If the instrument is physically damaged or does not function properly, it should not be used.

USE ONLY SUITABLY RATED VOLTAGE TEST LEADS TO IEC 1010-2-031. (600V CAT III Pollution Degree 2).

5. BATTERY REPLACEMENT

Replacement with other than the specified battery will invalidate the warranty.
Fit only Battery Type 9V Alkaline MN1604, IEC 6LR61 or equivalent.
- + will appear on the top row of the LCD display to indicate that the minimum operating battery voltage has been reached.

SAFETY WARNING
Before removing the battery cover, make sure that all external voltages are disconnected from the instrument. For certainty remove the leads.

To change the battery, see Fig. 4

- Switch off the instrument
- Undo the retaining screw on the battery cover and lift the cover clear of the unit.
- Replace the used battery
  Ensure the battery cover is replaced and the locking screw tightened, before further use.

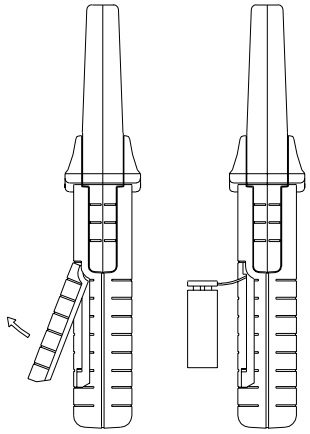


Fig. 4
Battery Replacement

6. WARRANTY

Your LEM HEME clamp on multimeter is guaranteed for one year from the date of purchase against defective material or workmanship. If the meter fails during the warranty period, we shall at our discretion, repair or replace it with a new or reconditioned unit provided we are satisfied that the failure is due to defective material or workmanship. To make a claim under warranty, the meter should be returned to us, postage prepaid, with a description of the defect. The use of a battery, other than that specified invalidates this warranty.

Goods alleged by the buyer to be defective shall not form the subject of any claim for injury, loss, damage, or any expense howsoever incurred whether arising directly or indirectly from such alleged defects other than death or personal injury resulting from the seller‘s negligence.

No condition is made or to be implied nor is any warranty given or to be implied as to the life or wear of goods supplied or that they will be suitable for any particular purpose or for use under specific conditions, notwithstanding that such purpose or conditions may be made known to the seller.

7. OTHER PRODUCTS

The LEM group offer a wide range of non-invasive transducers, probes and instrumentation for the measurement and analysis of current, voltage and power.

Since the introduction of the world's first digital AC/DC clamp-on ammeter in 1982, LEM HEME has continued to provide innovative test and measurement solutions encompassing current measurement from 5mA to 2000A.

LEM HEME policy is one of the continuous product improvement and the company reserves the right to revise the above specifications without notice